

CLAIMS

What is claimed is:

1. A system comprising:
 - a database containing antenna gain differences between multiple antenna patterns of a wireless network access node;
 - calculation logic for determining receive signal strength differences of a signal received using said multiple antenna patterns, said signal being transmitted by a device disposed within one or more of said multiple antenna patterns; and
 - comparison logic for comparing said receive signal strength differences to said antenna gain differences and identifying a closest match.
2. The system of claim 1, wherein said database contains antenna gain differences between multiple narrow antenna patterns and a wide antenna pattern.
3. The system of claim 1, wherein said database contains antenna gain differences associated with each antenna pattern of said wireless network access node.
4. The system of claim 1, wherein said database associates ones of said antenna gain differences in antenna gain difference sets.
5. The system of claim 4, wherein each antenna gain difference set includes angle information.
6. The system of claim 5, wherein said angle information comprises an azimuthal angle of a vector pointing from said wireless network access node to said device.
7. The system of claim 4, wherein antenna gain difference sets include antenna gain differences of a plurality of wireless network access nodes.
8. The system of claim 7, wherein said antenna gain difference sets including antenna gain differences of a plurality of wireless network access nodes include position information.

9. The system of claim 1, wherein said database further contains antenna gain differences between multiple antenna patterns of a second wireless network access node, said calculation logic is further for determining receive signal strength differences of a signal received from said device using said multiple antenna patterns of said second wireless network access node, and said comparison logic is further for comparing said receive signal strength differences of said second wireless network access node to said antenna gain differences and identifying a closest match.

10. The system of claim 9, further comprising:
location estimation logic for determining an estimated location of said device from an intersection point of vectors projected from said wireless network access node and said second wireless network access node.

11. The system of claim 9, further comprising:
location estimation logic for determining an estimated location of said device from position information stored in association with said closest match of said antenna gain differences.

12. The system of claim 1, wherein said calculation logic and said comparison logic are disposed at a centralized system in communication with a plurality of wireless network access nodes.

13. The system of claim 1, wherein said calculation logic and said comparison logic are disposed in a distributed configuration.

14. The system of claim 13, wherein said calculation logic is disposed within said wireless network access node.

15. The system of claim 1, further comprising:
a database containing predicted receive signal strength information for said multiple antenna patterns of said wireless network access node;
measurement logic for measuring receive signal strengths of a signal received from said device using said multiple antenna patterns; and
comparison logic for comparing said measured receive signal strengths to said predicted receive signal strength information and identifying a closest match.

16. The system of claim 15, wherein said database containing predicted receive signal strength information associates predicted receive signal strength information in sets having a distance associated therewith.

17. The system of claim 15, wherein said database containing predicted receive signal strength information associates predicted receive signal strength information in sets having a position associated therewith.

18. The system of claim 15, wherein said predicted receive signal strength information is predicted using a generic propagation model.

19. The system of claim 15, wherein said predicted receive signal strength information includes predicted receive signal strength information of a plurality of wireless network access nodes.

20. The system of claim 15, wherein said database containing predicted receive signal strength information further contains predicted receive signal strength information for multiple antenna patterns of a second wireless network access node, said measurement logic is further for measuring receive signal strengths of a signal received from said device using said multiple antenna patterns of said second wireless network access node, and said comparison logic is further for comparing said measured receive signal strengths of said second wireless network access node to said predicted receive signal strength information of said second wireless network access node and identifying a closest match.

21. The system of claim 20, further comprising:
location estimation logic for determining an estimated location of said device from an intersection point of arcs projected identified distances from said wireless network access node and said second wireless network access node.

22. The system of Claim 20, further comprising:
location estimation logic for determining an estimated location of said device from a midpoint of positions associated with said closest matches from said wireless network access node and said second wireless network access node.

23. The system of claim 20, further comprising:
location estimation logic for determining an estimated location of said device from position information stored in association with said closest match of said predicted receive signal strength information.
24. The system of claim 15, wherein said measurement logic and said comparison logic for comparing said measured receive signal strengths are disposed at a centralized system in communication with a plurality of wireless network access nodes.
25. The system of claim 15, wherein said measurement logic and said comparison logic for comparing said measured receive signal strengths are disposed in a distributed configuration.
26. The system of claim 25, wherein said measurement logic is disposed within said wireless network access node.
27. The system of claim 1, further comprising:
security logic for preventing access to a wireless network by said device as a function of said identified closest match.
28. The system of claim 1, further comprising:
location-based access security logic for providing levels of access to a wireless network by said device as a function of said identified closest match.
29. The system of claim 1, further comprising:
content delivery logic for providing content via a wireless network to said device as a function of said identified closest match.
30. The system of claim 1, further comprising:
management logic for providing management of at least one of wireless communications and wireless communication system resources as a function of said identified closest match.
31. The system of claim 1, further comprising:
asset tracking logic for providing at least one of asset tracking and asset inventorying automatically as a function of said identified closest match.

32. The system of claim 1, wherein said closest match is utilized in identifying a location of said device in a service area of a wireless network.

33. The system of claim 32, wherein said wireless network comprises a wireless local area network.

34. The system of claim 32, wherein said wireless network comprises a wireless metropolitan area network.

35. The system of claim 32, wherein said wireless network comprises a cellular network.

36. The system of claim 32, wherein said wireless network comprises a satellite network.

37. The system of claim 32, wherein said wireless network comprises a point-to-multipoint broadband network.

38. A system comprising:

a database containing predicted receive signal strength information for multiple antenna patterns of a wireless network access node;

measurement logic for measuring receive signal strengths of a signal received using said multiple antenna patterns, said signal being transmitted by a device disposed within one or more of said multiple antenna patterns; and

comparison logic for comparing said measured receive signal strengths to said predicted receive signal strength information and identifying a closest match.

39. The system of claim 38, wherein said database associates predicted receive signal strength information in sets of multiple antenna patterns having a distance associated therewith.

40. The system of claim 38, wherein said database associates predicted receive signal strength information in sets having a position associated therewith.

41. The system of claim 38, wherein said predicted receive signal strength information is predicted using a generic propagation model.

42. The system of claim 38, wherein said predicted receive signal strength information includes predicted receive signal strength information of a plurality of wireless network access nodes.

43. The system of claim 38, wherein said database further contains predicted receive signal strength information for multiple antenna patterns of a second wireless network access node, said measurement logic is further for measuring receive signal strengths of a signal received from said device using said multiple antenna patterns of said second wireless network access node, and said comparison logic is further for comparing said measured receive signal strengths of said second wireless network access node to said predicted receive signal strength information of said second wireless network access node and identifying a closest match.

44. The system of claim 43, further comprising:

location estimation logic for determining an estimated location of said device from an intersection point of arcs projected identified distances from said wireless network access node and said second wireless network access node.

45. The system of claim 43, further comprising:

location estimation logic for determining an estimated location of said device from a midpoint of positions associated with said closest matches from said wireless network access node and said second wireless network access node.

46. The system of claim 43, further comprising:

location estimation logic for determining an estimated location of said device from position information stored in association with said closest match.

47. The system of claim 38, wherein said measurement logic and said comparison logic are disposed at a centralized system in communication with a plurality of wireless network access nodes.

48. The system of claim 38, wherein said measurement logic and said comparison logic are disposed in a distributed configuration.

49. The system of claim 48, wherein said measurement logic is disposed within said wireless network access node.

50. The system of claim 38, further comprising:

a database containing antenna gain differences between said multiple antenna patterns of said wireless network access node;

calculation logic for determining receive signal strength differences of a signal received from said device using said multiple antenna patterns; and

comparison logic for comparing said receive signal strength differences to said antenna gain differences and identifying a closest match.

51. The system of claim 50, wherein said database containing antenna gain differences associates ones of said antenna gain differences in antenna gain difference sets.

52. The system of claim 51, wherein said antenna gain difference sets include angle information.

53. The system of claim 51, wherein said antenna gain difference sets include position information.

54. The system of claim 51, wherein antenna gain difference sets include antenna gain differences of a plurality of wireless network access nodes.

55. The system of claim 54, wherein said antenna gain difference sets include position information.

56. The system of claim 50, wherein said database containing antenna gain differences further contains antenna gain differences between multiple antenna patterns of a second wireless network access node, said calculation logic is further for determining receive signal strength differences of a signal received from said device using said multiple antenna patterns of said second wireless network access node, and said comparison logic for comparing said receive signal strength differences is further for comparing said receive signal strength differences of said second wireless network access node to said antenna gain differences and identifying a closest match.

57. The system of claim 56, further comprising:
location estimation logic for determining an estimated location of said device from an intersection point of vectors projected from said wireless network access node and said second wireless network access node.

58. The system of claim 56, further comprising:
location estimation logic for determining an estimated location of said device from position information stored in association with said closest match of said antenna gain differences.

59. The system of claim 50, wherein said calculation logic and said comparison logic for comparing said receive signal strength differences are disposed at a centralized system in communication with a plurality of wireless network access nodes.

60. The system of claim 50, wherein said calculation logic and said comparison logic for comparing said receive signal strength differences are disposed in a distributed configuration.

61. The system of claim 60, wherein said calculation logic is disposed within said wireless network access node.

62. The system of claim 38, wherein said comparison logic is disposed at a centralized system in communication with a plurality of wireless network access nodes.

63. The system of claim 38, wherein said comparison logic is disposed in a distributed configuration.

64. The system of claim 38, further comprising:
security logic for preventing access to a wireless network by said device as a function of said identified closest match.

65. The system of claim 38, further comprising:
location-based access security logic for providing levels of access to a wireless network by said device as a function of said identified closest match.

66. The system of claim 38, further comprising:
content delivery logic for providing content via a wireless network to said device as a function of said identified closest match.

67. The system of claim 38, further comprising:
management logic for providing management of at least one of wireless communications and wireless communication system resources as a function of said identified closest match.

68. The system of claim 38, further comprising:
asset tracking logic for providing at least one of asset tracking and asset inventorying automatically as a function of said identified closest match.

69. The system of claim 38, wherein said closest match is utilized in identifying a location of said device in a service area of a wireless network.

70. The system of claim 69, wherein said wireless network comprises a wireless local area network.

71. The system of claim 69, wherein said wireless network comprises a wireless metropolitan area network.

72. The system of claim 69, wherein said wireless network comprises a cellular network.

73. The system of claim 69, wherein said wireless network comprises a satellite network.

74. The system of claim 69, wherein said wireless network comprises a point-to-multipoint broadband network.

75. A method for providing information useful in determining a position of a device within a wireless network, said method comprising:

calculating antenna gain differences between multiple antenna patterns of a wireless network access node;

determining receive signal strength differences of a signal received using said multiple antenna patterns, said signal being transmitted by a device disposed within one or more of said multiple antenna patterns; and

comparing said receive signal strength differences to said antenna gain differences and identifying a closest match.

76. The method of claim 75, further comprising:

identifying a direction associated with said closest match.

77. The method of claim 76, further comprising:

estimating a position of said device as a function of said direction.

78. The method of claim 75, further comprising:

identifying a position stored in association with said closest match.

79. The method of claim 75, further comprising:

predicting receive signal strength information for said multiple antenna patterns of said wireless network access node; and

comparing measured receive signal strengths of a signal received from said device using said multiple antenna patterns to said predicted receive signal strength information and identifying a closest match.

80. The method of claim 79, further comprising:

identifying a direction associated with said closest match of said antenna gain differences; and

identifying a distance associated with said closest match of said receive signal strengths.

81. The method of claim 80, further comprising:

estimating a position of said device as a function of said direction and said distance.

82. The method of claim 79, further comprising:
identifying a direction associated with said closest match of said antenna gain differences; and
identifying a position associated with said closest match of said receive signal strengths.

83. The method of claim 79, further comprising:
estimating a position of said device as a function of said closest match of said antenna gain differences; and
separately estimating a position of said device as a function of said closest match of said receive signal strengths.

84. The method of claim 83, wherein a one of said position estimates is used to confirm the other of said position estimates.

85. The method of claim 79, further comprising:
identifying a position associated with said closest match of said antenna gain differences;
identifying a position associated with said closest match of said receive signal strengths;
and
estimating a position of said device as a function of said position associated with said antenna gain differences and said position associated with said receive signal strengths.

86. The method of claim 75, wherein said calculating antenna gain differences comprises:
calculating antenna gain differences between each of a plurality of narrow beam antenna patterns and a wide beam antenna pattern.

87. The method of claim 75, wherein said calculating antenna gain differences comprises:
calculating antenna gain differences for each antenna pattern combination in a set of antenna patterns.

88. The method of claim 75, further comprising:
providing network access as a function of said closest match.

89. The method of claim 75, further comprising:
providing data content as a function of said closest match.

90. The method of claim 75, further comprising:
providing management of network resources as a function of said closest match.

91. A method for providing information useful in determining a position of a device within a wireless network, said method comprising:

predicting receive signal strength information for multiple antenna patterns of a wireless network access node; and

comparing measured receive signal strengths to said predicted receive signal strength information and identifying a closest match.

92. The method of claim 91, further comprising:
identifying a distance associated with said closest match.

93. The method of claim 92, further comprising:
estimating a position of said device as a function of said distance.

94. The method of claim 91, further comprising:
identifying a position associated with said closest match.

95. The method of claim 91, further comprising:
calculating antenna gain differences between said multiple antenna patterns of said wireless network access node;
determining receive signal strength differences of a signal received from said device using said multiple antenna patterns; and
comparing said receive signal strength differences to said antenna gain differences and identifying a closest match.

96. The method of claim 95, further comprising:
identifying a direction associated with said closest match of said antenna gain differences; and
identifying a distance associated with said closest match of said receive signal strengths.

97. The method of claim 96, further comprising:
estimating a position of said device as a function of said direction and said distance.

98. The method of claim 95, further comprising:
identifying a direction associated with said closest match of said antenna gain differences; and
identifying a position associated with said closest match of said receive signal strengths.

99. The method of claim 95, further comprising:
estimating a position of said device as a function of said closest match of said antenna gain differences; and
separately estimating a position of said device as a function of said closest match of said receive signal strengths.

100. The method of claim 99, wherein a one of said position estimates is used to confirm the other of said position estimates.

101. The method of claim 95, further comprising:
identifying a position associated with said closest match of said antenna gain differences;
identifying a position associated with said closest match of said receive signal strengths;
and
estimating a position of said device as a function of said position from said antenna gain differences and said position from said receive signal strengths.

102. The method of claim 91, further comprising:
providing network access as a function of said closest match.

103. The method of claim 91, further comprising:
providing data content as a function of said closest match.

104. The method of claim 91, further comprising:
providing management of network resources as a function of said closest match.

105. A system for providing location positioning of a device in a wireless network, said system comprising:

a channel model independent determination algorithm utilizing receive signal strength differences between multiple antenna patterns of a wireless network node to determine information with respect to a position of said device; and

a channel model based determination algorithm utilizing receive signal strengths of said multiple antenna patterns to determine information with respect to a position of said device.

106. The system of claim 105, wherein said channel model independent determination algorithm further utilizes antenna gain differences between said multiple antenna patterns.

107. The system of claim 105, wherein said channel model based determination algorithm further utilizes signal strength predictions provided by modeling an environment of said wireless network.

108. A system for providing location positioning of a device in a wireless network, said system comprising:

a channel model independent determination algorithm utilizing receive signal strength differences between multiple antenna patterns of a wireless network node and antenna gain differences between said multiple antenna patterns to determine information with respect to a position of said device.

109. A system for providing location positioning of a device in a wireless network, said system comprising:

a channel model based determination algorithm utilizing receive signal strengths of said multiple antenna patterns and signal strength predictions provided by modeling an environment of said wireless network to determine information with respect to a position of said device.